Space Weather Forecast

Issued on Tuesday, 07 June 2022 at 01:21 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight Chance of Minor Geomagnetic Storm G1 at first, else no significant activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been very low over the past 24 hours, with X-ray activity comfortably below common class, with no flares observed. There are now just two sunspot regions on the sun, with both stable, unproductive in terms of flares, and magnetically unipolar. Potentially adding to these numbered regions, a third spot group developed in the southwest, becomign magnetically bipolar by the period's end, but again, with no flares produced.

A minor 'coronal dimming' (a possible Coronal Mass Ejection (CME) signature) was observed in the northeastern quadrant around 06/1300UTC, however any resultant CME is not apparent on following satellite imagery, and none were observed in the 24 hours.

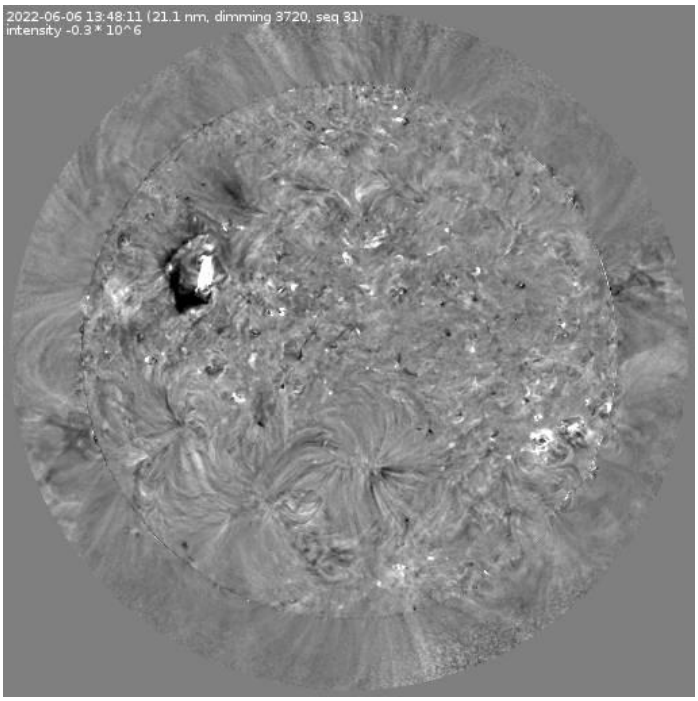

Figure 1: Time-integrated extreme UV satellite image of the 06/1300UTC 'coronal dimming' (upper left). As yet there is no evidence of any resulting CME on satellite imagery with a wider field of view. Image processing courtesy of SIDC ROB.

Solar Wind / Geomagnetic Activity: The solar wind started in a slow regime but saw a discontinuity in most measures that coincided with the expected arrival of a CME, possibly that from filament eruption(s) on 01 and 02 June (arcs of plasma leaving the sun as CMEs).

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The solar wind speed started slow, but saw a step-wise increase to an eventual peak after 06/0920UTC, albeit still withing normal background levels given its low starting value. The number of particles comprising the solar wind, which had been hitherto slightly elevated, peaked before declining as the CME's influence matured, while the magnetic field also showed a similar response.

The net effect of the above solar wind measures was nevertheless mainly quiet on geomagnetism, with a provisional peak in the 3-hour interval containing the arriving CME, 09-12UTC, but still comfortably below Minor Storm G1. A small sudden impulse was detected at Earth-based magnetometers around 06/1030UTC, seeing a deflection of around 20nT in the horizontal component of the magnetic field in 20 minutes at Hartland, UK.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be very low initially. Returning sunspot regions may increase the risk of flares from midweek UTC, although the degree to which this occurs is uncertain pending arrivals over the eastern limb.

Solar Wind / Geomagnetic Activity: Effects from the ongoing 01/02 June CME ought to wane through the first 24-hour period, leaving a slow solar wind regime. There is a slight chance of Minor Storm G1 being attained if the slow wind is again interrupted later on day one (Tuesday 07 June and into Wednesday 08 June) by a possible glancing impact from another CME which left the northeast of the sun on 04 June.

Quiet conditions should otherwise again predominate after any CME interjection, ahead of a possible minor fast wind arriving at the very end of the forecast period (from a small coronal hole). Even after this fast wind onset, G1 is unlikely to occur.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	1	5	5	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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